CLAIMS

What is claimed is:

1. An insulated flexible electrical circuit suitable for implantation comprising:

a first polyparaxylylene layer;

a second polyparaxylylene that defines at least one aperture exposing an electrical conductor, and

said electrical conductor located between said first polyparaxylylene layer and said second polyparaxylylene layer.

2. The electrical circuit of claim 1, wherein said polyparaxylylene is comprised of Parylene.

3. The electrical circuit of claim 1, further comprising at least one polymer layer between said first polyparaxylylene layer and said second polyparaxylylene layer.

4. The electrical circuit of claim 3, wherein said polymer is comprised of polyimide.

5. The electrical circuit of claim 1, further comprising at least one polymer layer on said first polyparaxylylene layer or said second polyparaxylylene layer that is not located between said layers.

6. The electrical circuit of claim 5, wherein said polymer is comprised of polyimide.

7. The electrical circuit of claim 1, further comprising a layer of a polymer between said first polyparaxylylene layer and said electrical conductor.

8. The electrical circuit of claim 7, wherein said polymer is comprised of polyimide.

9. The electrical circuit of claim 1, wherein said electrical conductor is suitable for stimulating a nerve.

10. The electrical circuit of claim 1, wherein said electrical conductor is suitable for sensing a signal from a nerve.

11. The electrical circuit of claim 1, wherein said second polyparaxylylene that defines at least one aperture further defines an electrode site suitable for detecting or transmitting signals to living tissue.

12. The electrical circuit of claim 1, wherein said electrical conductor is comprised of a biocompatible material.

13. The electrical circuit of claim 12, wherein said biocompatible material is selected from at least one metal from the group of titanium, platinum, gold, or iridium.

14. The electrical circuit of claim 1, wherein said electrical conductor is at least partially coated with a biocompatible material.

15. The electrical circuit of claim 14, wherein said biocompatible material is comprised of titanium nitride.

16. A method of forming an insulated flexible electrical circuit suitable for implantation, comprising the steps of:

choosing a rigid substrate;

cleaning said rigid substrate;

depositing a first polyparaxylylene layer on said rigid substrate;

depositing an electrical conductor on said first polyparaxylylene layer;

patterning said electrical conductor to form a conductive path thereon;

depositing a second polyparaxylylene layer;

defining at least one select portion of said second polyparaxylylene layer; and

removing said at least one select portion of said second polyparaxylylene layer defining at least one aperture therein, thereby forming at least one electrode that is suitable for contacting living tissue.

17. The method of claim 16, wherein said step of choosing a rigid substrate is accomplished by choosing said substrate comprised of glass.

18. The method of claim 16, further comprising the step of enhancing said first polyparaxylylene layer for adhesion after said step of depositing a first polyparaxylylene layer.

19. The method of claim 16, further comprising the step of enhancing said electrical conductor for adhesion after said step of patterning said electrical conductor to form a conductive path.

20. The method of claim 16, further comprising the step of enhancing said first polyparaxylylene layer for adhesion before said step of depositing a second polyparaxylylene layer.

21. The method of claim 16, further comprising the step of applying silane to enhance adhesion.

22. The method of claim 16, further comprising the step of modifying by chemical means said first polyparaxylylene layer.

23. The method of claim 16, further comprising the step of roughening the polyparaxylylene surface.

24. The method of claim 16, further comprising the step of compressing thermally said first polyparaxylylene layer and said second polyparaxylylene layer to increase adhesion.

25. The method of claim 16, wherein said step of removing said at least one select portion of said second polyparaxylylene layer is accomplished by etching with reactive ions.